UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,629	11/24/2003	Preston F. Crow	EMC-99-027DIV1	4258

24227 7590 07/27/2005	EXAMINER	
EMC CORPORATION	LY, ANH	
OFFICE OF THE GENERAL COUNSEL		
176 SOUTH STREET	ART UNIT	PAPER NUMBER
HOPKINTON, MA 01748	2162	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/720,629	CROW ET AL.
	Examiner	Art Unit
	Anh Ly	2162

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>09 May 2005</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>16-28</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>21-25</u> is/are allowed.

6)☒ Claim(s) <u>16-20 and 26-28</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>11/244/2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

U.S. Patent and Trademark Office

PTOL-326 (Rev. 1-04)   Office Action Summary   Part of Paper No./Mail Date 20050720

DETAILED ACTION

1.   This Office Action is response to Applicants' Amendment filed on 05/09/2005.

2.   Claims 1-15 were cancelled.

3.   Claims 26-28 are added.

4.   Claims 16-28 are pending in this Application.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

7.   Claims 16-20 and 26-28 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Pub. No. US: 2004/0133570 A1 of Soltis in view of US Patent No.

4,761,737 issued to Duvall et al. (hereinafter Duvall).

With respect to claim 16, Soltis teaches a memory storage system having

devices organized in physical data blocks for physical storage of data and at least one

processor including an operating system having an extent based file system for

abstracting file names to the physical data blocks in the devices by assigning an inode

to each file (abstract, figs. 1 & 2, sections 0010, 0026 and 0030); and

each inode adapted to store extents having a field to point to a logical volume at

least two of the extent being direct extents indicating a logical volume containing data

blocks (abstract, , sections 0010, 0055, 0062, and 0079; also see sections 0126-0127).

Soltis teaches shared file system over a distributed network attaching storage

devices from existing file system being in the Unix based operating system (section

0035) in the shared storage distributed file systems, which are required to map to the

data blocks stored on the storage devices. The distributed file system consists of inode

files, which contain a list of extents that address data blocks, and logical volume from

the NAS devices partitioned into multiple segments for allocation and de-allocation file

data (sections 0062, 0073 and 0076). Also Soltis teaches direct extents for addressing

of the data and direct pointers in the NAS devices. Soltis does not clearly teach a first

direct extent pointing to second data blocks in the data storage devices, the first direct

extent indicating a different logical volume than a second direct extent.

However, Duvall teaches UNIX file system residing on mass storage devices

including a plurality of sequence of blocks, which compose the file system as physical

data blocks for the storage devices (col. 2, lines 46-61 and col. 4, lines 53-67) and

system's processor or microprocessor (col. 3, lines 57-67 and col. 4, lines 28-41) and

direct inode contains up to ten block of addresses and level of blocks (col. 2, lines 62-67

and col. 3, lines 1-6).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Soltis with the teachings of

Duvall, wherein the storage system for physical storage of data in the system provided

therein (Soltis's figs 1& 2), would incorporate the use of direct extent and indirect extent

pointing to the third data blocks storing a third direct extent, in the same conventional

manner as described by Duvall (col. 2, lines 62-67 and col. 4, lines 53-67). The

motivation being to have a multiple of storage devices having a plurality of UNIX based

file systems for easing or more flexible for extending the data file and enabling to

access the same copy of user data without the need for special operating systems.

With respect to claim 17, Soltis teaches a memory storage system as discussed

in claim 16.

Soltis teaches shared file system over a distributed network attaching storage

devices from existing file system being in the Unix based operating system (section

0035) in the shared storage distributed file systems, which are required to map to the

data blocks stored on the storage devices. The distributed file system consists of inode

files, which contain a list of extents that address data blocks, and logical volume from

the NAS devices partitioned into multiple segments for allocation and de-allocation file

data (sections 0062, 0073 and 0076). Also Soltis teaches direct extents for addressing

of the data and direct pointers in the NAS devices. Soltis does not clearly teach at least

one indirect extent pointing to third data blocks storing a third direct extent.

However, Duvall teaches mapping disk block, the segment start address of the

map (col. 6, lines 40-50; also see col. 16, lines 55-67) UNIX file system residing on

mass storage devices including a plurality of sequence of blocks, which compose the

file system as physical data blocks for the storage devices (col. 2, lines 46-61 and col.

4, lines 53-67) and system's processor or microprocessor (col. 3, lines 57-67 and col. 4,

lines 28-41) and direct inode contains up to ten block of addresses and level of blocks

(col. 2, lines 62-67 and col. 3, lines 1-6).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Soltis with the teachings of

Duvall, wherein the storage system for physical storage of data in the system provided

therein (Soltis's figs 1& 2), would incorporate the use of direct extent and indirect extent

pointing to the third data blocks storing a third direct extent, in the same conventional

manner as described by Duvall (col. 2, lines 62-67 and col. 4, lines 53-67). The

motivation being to have a multiple of storage devices having a plurality of UNIX based

file systems for easing or more flexible for extending the data file and enabling to

access the same copy of user data without the need for special operating systems.

With respect to claim 18, Soltis teaches wherein each extent further includes a field to indicate whether the extent points to a block of extents or a block of data (sections 0076, 0078-0079).

With respect to claim 19, Soltis teaches a memory storage system as discussed in claim 16.

Soltis teaches shared file system over a distributed network attaching storage devices from existing file system being in the Unix based operating system (section 0035) in the shared storage distributed file systems, which are required to map to the data blocks stored on the storage devices. The distributed file system consists of inode files, which contain a list of extents that address data blocks, and logical volume from the NAS devices partitioned into multiple segments for allocation and de-allocation file data (sections 0062, 0073 and 0076). Also Soltis teaches direct extents for addressing of the data and direct pointers in the NAS devices. Soltis does not clearly teach comprises a start address field and a length field, the start address field including a pointer to a logical volume portion and a pointer to a data block in the logical volume, and the length field fixing the number of consecutive data blocks pointed to by the extent.

However, Duvall teaches the segment start address of the map (col. 6, lines 40-50; also see col. 16, lines 55-67) and the length of a segment (col. 19, lines 17-40 and col. 17, lines 47-52) and field for segment of the mapped file (col. 18, lines 6-20), and direct inode contains up to ten block of addresses and level of blocks (col. 2, lines 62-67 and col. 3, lines 1-6).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Soltis with the teachings of Duvall, wherein the storage system for physical storage of data in the system provided therein (Soltis's figs 1& 2), would incorporate the use of direct extent and indirect extent pointing to the third data blocks storing a third direct extent, in the same conventional manner as described by Duvall (col. 2, lines 62-67 and col. 4, lines 53-67). The motivation being to have a multiple of storage devices having a plurality of UNIX based file systems for easing or more flexible for extending the data file and enabling to access the same copy of user data without the need for special operating systems.

With respect to claim 20, Soltis teaches the operating system being a UNIX based system (section 0035).

With respect to claim 26, Soltis teaches in a memory storage device employing an operating system comprising instructions for a method for storing data files, the method comprising: writing a plurality of extents to an inode assigned to a file, including first and second direct extents (abstract, section 0003, 0004-0005 and 0007);

writing data to first and second physical data blocks (sections 0066, 0076 and 0078-0079); and

writing at least one extent to the third physical data block, the at least one extent pointing to a physical data block storing a segment of the file (sections 0106-0107 and 0113-0115).

Soltis teaches shared file system over a distributed network attaching storage devices from existing file system being in the Unix based operating system (section

0035) in the shared storage distributed file systems, which are required to map to the

data blocks stored on the storage devices. The distributed file system consists of inode

files, which contain a list of extents that address data blocks, and logical volume from

the NAS devices partitioned into multiple segments for allocation and de-allocation file

data (sections 0062, 0073 and 0076). Also Soltis teaches direct extents for addressing

of the data and direct pointers in the NAS devices. Soltis does not clearly teach said first

and second direct extents pointing to the first and second physical data blocks; inserting

an indirect extent in an inode between the first and second direct extents, the indirect

extent pointing to a third physical data block;

However, Duvall teaches UNIX file system residing on mass storage devices

including a plurality of sequence of blocks, which compose the file system as physical

data blocks for the storage devices (col. 2, lines 46-61 and col. 4, lines 53-67) and

system's processor or microprocessor (col. 3, lines 57-67 and col. 4, lines 28-41) and

direct inode contains up to ten block of addresses and level of blocks (col. 2, lines 62-67

and col. 3, lines 1-6).

Therefore, it would have been obvious to a person of ordinary skill in the art at

the time the invention was made to combine the teachings of Soltis with the teachings of

Duvall, wherein the storage system for physical storage of data in the system provided

therein (Soltis's figs 1& 2), would incorporate the use of direct extent and indirect extent

pointing to the third data blocks storing a third direct extent, in the same conventional

manner as described by Duvall (col. 2, lines 62-67 and col. 4, lines 53-67). The

motivation being to have a multiple of storage devices having a plurality of UNIX based

file systems for easing or more flexible for extending the data file and enabling to

access the same copy of user data without the need for special operating systems.

With respect to claim 27, Soltis teaches writing a length field to each extent, the

length field fixing the number of consecutive data blocks pointed to by the extent

(several consecutive blocks: sections 0010 and 0079).

With respect to claim 28, Soltis teaches the operating system being a UNIX-

based System (section 0035).

8.   Claims 21-25 are allowed.

Allowable Subject Matter

9.   The following is a statement of reasons for the indication of allowable subject

matter:

The claimed invention is directed to a distributed storage system having a

plurality of processors and a plurality of data storage devices. The system comprises an

indirect extent being inserted in the inode between the **first and second** direct extents,

the indirect extent pointing to third physical data blocks in the data storage devices, and

at least one extent being written to the **third** physical data blocks, the at least one

extent pointing to **fourth** physical data blocks and each of the first, second and fourth

data blocks storing a segment of the file. .Since these distinct features, the claim 21 and

its all-dependent claims, 22-25 are allowable.

Contact Information

10.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh Ly whose telephone number is (571) 272-4039 or via E-Mail: ANH.LY@USPTO.GOV **or fax to (571) 273-4039.** The examiner can normally be reached on TUESDAY – THURSDAY from 8:30 AM – 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene, can be reached on (571) 272-4107 or **Primary Examiner Jean Corrielus (571) 272-4032.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see **http://pair-direct.uspto.gov**. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). Any response to this action should be mailed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, or faxed to: Central Fax Center **(571) 273-8300**
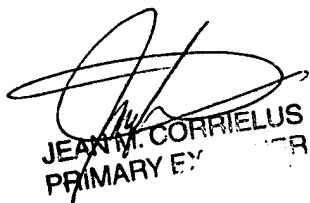
JEAN M. CORRIELUS
PRIMARY EXAMINER

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JUL. 20th, 2005